



MCFRS IN-SERVICE TRAINING PROGRAM

**RESIDENTIAL AND COMMERCIAL
TOWNHOUSE FIRES**



MCFRS In-Service Training Program

RESIDENTIAL AND COMMERCIAL TOWNHOUSE FIRES

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RESIDENTIAL AND COMMERCIAL TOWNHOUSE FIRES

I. OVERVIEW

Fires in townhouses present a life safety hazard as well as a potential heavy property loss concern. Their sandwiched design breeds exposure problems, whether or not the exposure is separated by a firewall. Decks, storage sheds, trash bins, etc. may also be attached. In recent years, the advent of lightweight construction techniques has increased the life safety hazard for suppression crews because of the potential for early collapse. Due to the variety of layouts and floor plans that the initial arriving company may be faced with, a rapid size up must be performed to determine the location of the fire within the building as well as conditions in the rear and eventually the attached exposures.



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II. OBJECTIVES

Operations personnel will be able to:

- Describe residential and commercial townhouses and row houses, which comprise a large portion of the structures within our response area
- Point out the construction features of such buildings with regard to protecting life and extinguishing fires
- Describe the hazards associated with these types of structures and recommend precautions that should be taken
- Discuss tactics for fires that occur in such structures
- Discuss tactical operations for engine, truck, and rescue companies for fires that occur in such structures



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III. CRITICAL DISCUSSION POINTS

A. TERMINOLOGY

The importance of accurately defining different styles of attached dwellings can not be understated in determining tactics for each and their attached exposures.

1. Townhouse - used to describe various styles of attached dwellings. These can range from old row houses, to duplexes, quads, and piggybacks. Each occupancy has a separate address and its own entrance. A townhouse is a one to four-story unit normally attached to several other units. These units may or may not be completely separated by substantial firewalls. Normally, utilities are completely separate from one another.
2. Duplex - two dwelling units connected together under one roof.
3. Quad – four dwelling units connected together back to back, under a common roof, with separate addresses and separate entrances possibly on all four sides.
4. Piggybacks - two stacked units (one over the other) with attached units on each side, each with a separate address and entrance. These are typically two-level units over one-level units, but other floor plan variations may be found.

B. DESCRIPTION

1. Townhouses may or may not have a garage, which may store one or two vehicles. It may be on the lowest level in the front or it may be detached in the rear off of a common alley.
2. Townhouses may range from two to four floors in height and may be different in height from front to rear (i.e., two floors on the front and three floors on the rear or vice versa).
3. Townhouses may have unfinished basements that allow a fire originating in that area to quickly spread to and compromise structural components (floor joists, plywood I-beams, plywood floors, etc.).
4. Commercial townhouses may not involve the same life safety concerns.
5. Commercial townhouses do not differ greatly from residential townhouses in construction type; however, they are designated such to differentiate the two occupancy types.

C. CONSTRUCTION

1. Townhouse construction is typically Type V, Wood Frame. Platform frame construction is typical. Because of this, there are inherent barriers to the spread of fire through the walls.
2. The roof frames are of two basic types: lightweight or conventional. Lightweight - Triangular trusses that rest on the top floor load-bearing and non load-bearing walls, or parallel chord trusses or plywood I beams forming the peak from the front and rear load-bearing walls to a ridge pole.
Conventional - Sawn wood rafters forming the peak from the front and rear load-bearing walls to a ridgepole.
3. The roof deck over the trusses is usually 4 x 8 foot plywood sheathing, but can also be particleboard or oriented strand board (OSB) of the same dimension. The roof deck over sawn wood rafters is usually plywood sheathing or may

occasionally be 1x 4 inch or 1 x 6 inch boards nailed perpendicular to the rafters. The covering will usually be asphalt shingles, but occasionally wood shingles. Many townhouses constructed during the 1980s have FRT (fire retardant) plywood sheathing roof deck inside each party wall. Much of this FRT plywood was later determined to be defective. Some were replaced, but companies should suspect the presence of FRT plywood and use caution during fire ground operations. The integrity of an FRT roof should be considered to be unsafe even before a fire occurs.

4. The roof is typically pitched from the center peak to the front and rear, and occasionally, a perpendicular gable will be found on the front. The roof is usually steep enough to require a roof ladder or aerial device from which to work. The roof style may also be flat or mansard. If possible, firefighters should work supported independently from the roof.
5. Mansard roofs often wrap around division walls outside the building and allow fire to spread to the adjoining cocklofts.
6. Attics, if present, are usually unfinished and may be used for storage by occupants. Access to this space may be through a scuttle or pull-down stairs located somewhere in the top floor ceiling, including inside a bathroom or a closet. This space may be the location of water heaters and HVAC units.
7. The presence of a dormer does not always indicate a finished attic. The dormer may be false, only attached to the exterior roof surface and not connected to the attic.
8. Townhouses may have a top floor vaulted ceiling or a loft. There may be flooring in the attic that will make application of fire streams and pulling ceilings from the floor below difficult.
9. Knee walls will be found in units with lofts and dormers. Knee walls may contain hidden fire, and must be opened to check for fire extension.
10. Walls will be constructed of dimensional lumber, 2 x 4 inch in size, and may be load-bearing or non-load-bearing. Occasionally, lightweight aluminum studs may be found in non-load-bearing walls. Exterior walls may be covered with brick veneer, wood, aluminum, or vinyl siding over a thin layer of insulating sheathing. In the case of aluminum or vinyl

siding, it can be easily breached. All interior walls are typically covered with gypsum. Foundation walls are either masonry block or a poured reinforced concrete monolithic (cast-in-place) wall.

11. Insulation can be rolled fiberglass, blown-in rock wool, or blown-in cellulose. Insulation will be found in attics, exterior walls and, in some structures, the interior walls.

12. **Fire Walls** - Depending on when the townhouse was constructed and what edition of building code was in effect at the time, firewalls will be:

- Located between each address
- Located between every other address
- Non-existent
- Between the living spaces (occupied floors) only and does not extend into the attics or basements.

Firewalls are constructed of two types:

- Masonry
- 1-inch gypsum layers on both sides of the wall studs

Solid masonry firewalls can often be seen from the exterior if parapets extend through the roof. Masonry firewalls may stop at the underside of the roof deck. Rooflines (the ridges) may be offset at each address to accomplish separating the attic spaces. Firewalls may be penetrated to allow the running of utilities. Familiarity of buildings in each respective response district, especially during construction, will provide knowledge of the type and location of firewalls.

13. Floor decking is typically wood (boards) or wood composite (plywood or chipboard). The decking may be covered with carpet and pad, masonry or vinyl tile, or tongue-and-groove decorative wood. The decking material will be laid on sawn wood joists, parallel chord trusses, or plywood I-beams. These joists, trusses, or beams will be spaced from 16 to 24 inches on center. Floor joist direction can be side-to-side or front-to-rear. If front-to-rear, an unfinished basement may have an unprotected steel girder and Lally columns (hollow steel poles filled with concrete used as columns) supporting the floor above which presents a collapse hazard when exposed to fire. If side-to-side, joists will be supported on the basement load-bearing walls.

14. The most common style of window utilized in townhouses is a double-hung, sliding sash type (double pane storm windows

are quite common now due to energy efficiency and will require additional efforts during ventilation). The glazing may be of single, double, or triple thickness. Other styles of windows may be found and should be noted during pre-planning and size-up opportunities. Casement windows create a special hazard. Many of these types of windows are found in construction dating from the late 1940s to the late 1960s. The windows have steel frames set in concrete or masonry. While breaking all the glass in the windows will ventilate the affected area, entrance and exit through the remaining window frame is physically blocked. The window must be opened by lifting a latch and rotating a crank. Removing the frame with force would be very difficult under adverse conditions and would require the use of heavy forcible entry tools. Firefighters should note these windows in their size up upon arrival at a structure fire. Treat casement windows as if they were barred.

15. Exterior doors on residential townhouses are solid wood, insulated metal, or wood panel. In addition, you may find sliding glass or French doors in the rear. Commercial townhouses may have a tempered glass door in the front. Exterior doors are inward opening on residential and outward opening on commercial. Interior doors are commonly hollow-core wood doors. Inward opening doors are typically found leading to bedrooms and bathrooms. Outward opening doors usually lead to closets or basement stairs.

There are three standard locks on exterior doors. These are mortise, rim, and tubular dead bolt. Mortise locks were the most prevalent locks up until the 1970s. Rim and tubular deadbolt locks became more popular during the building boom of the 1970s, 1980s, and early 1990s. Mortise locks were reintroduced as the primary lock in new construction in the late 1990s.

16. One of the most notable construction features in residential townhouses is the open stairway. Open stairs allow quick spread of fire and products of combustion to floors above.

A door may or may not be found at the top of the basement stairs. If present, this will slow the spread of fire and its products to upper floors. In commercial townhouses, the stairwell will be enclosed. A fire on lower floors severely endangers occupants on upper floors. This is especially present in residential occupancies as bedrooms are typically found on upper floors. Stairs are an important construction feature that require hose line protection to

maintain access and egress routes. Members should remember, in most cases, that stairways are stacked. Stairs are also usually located against a wall. Storage under basement stairs is common. These stairs can be “unfinished” on the underside. A fire originating in this storage area can quickly lead to the collapse of the stairs. Many modern townhouses have steep, narrow, or spiral stairways to upper levels that may inhibit hose line advancement and rescue operations.

17. Depending on when the townhouse was constructed, it may or may not be sprinklered, and may or may not have a fire department connection.
18. Chimneys can be either masonry with a tile flue, or wood-framed with a metal flue. The metal flue, also known as zero clearance or pre-fabricated chimney, is a galvanized metal pipe in a wood-framed chimney with siding on the exterior. The wood-framed chimney can be non-fire stopped and interconnected to adjoining floor/ceiling voids. Chimney fires can create temperatures high enough to cause ignition of the surrounding framing members. Fire spread to attached occupancies is likely where occupancies utilize a common chimney (quadrplexes, piggybacks).
18. The interior walls of the garage, if attached to the townhouse, will have a minimum of ½-inch drywall. The swinging door from the living area to the garage will be a fire rated door. The door, doorframe, and hardware are not required to be a rated assembly. It is typically not self closing and opens inward from the garage into the living area. The area above the garage is normally finished living space. A vehicle or contents fire in a garage will allow for rapid fire extension to other areas of the structure. The presence of a finished living area over the garage presents a serious life hazard. The overhead entrance door to the garage and its mounting hardware will not be fire-rated. These types of doors are known to collapse when left open and exposed to fire.

D. LIFE SAFETY HAZARDS

1. Life hazard is our number one priority. Regardless of the time of day, townhouses may have a significant life hazard. Life hazard includes those in attached exposures. Victims are often found in a normal egress pathway (near windows, in doorways, hallways, etc.) Victims may also be found in bed. Bedrooms are usually located on the top floor, but may also be located in the basement.
2. Due to sub-leasing, occupants can be found in both basement living areas and on the top floor (there maybe sub-basements being used as illegal sleeping areas). In commercial townhouse occupancies, transient occupants unfamiliar with the means of egress may create a life safety hazard. Security measures may also negatively affect life safety by not only blocking exits, but also by impeding entrance by fire companies.

E. FIRE HAZARDS

1. The fact that townhouses are generally constructed of wood adds greatly to the fire hazard. The use of combustible interior finishes and the type of furnishings found within these structures, contributes to the fire loading. Generally, these types of occupancies are considered to have a relatively “low” fire loading. The presence of highly combustible siding can greatly contribute to the fire hazard. Vinyl, wood or asbestos siding may contribute to vertical and horizontal fire spread, creating a severe exposure problem.
2. The presence of interior void spaces may add to fire spread. Vertical and horizontal openings allow smoke and fire to enter and attack the structure itself. Fire that has entered these voids will necessitate the opening of floors, ceilings, and walls. This is especially crucial in balloon-frame construction.
3. The presence of cooking, utility, and mechanical areas creates the potential for fire. It should also be recognized that in the residential setting, the potential for ignition exists from many sources that include space heaters, pilot lights and burners, and smoking materials.

4. The presence of fireplaces and chimneys may create a potential for fire extension throughout the structure. Improper installation or time may compromise the integrity of the components, allowing fire or heat to escape and ignite surrounding combustible members.
5. Fire spread to adjoining exposures is a major concern; Fire can spread horizontally to adjoining townhouses by passing through penetrations made in the firewall or by spreading over the firewall.
6. Fire can spread over combustible exterior siding and be drawn into the attic vents on the attached occupancy around the firewall.
7. Fire spread from the contents to the structural members can cause weakening of the structural members and thus collapse. The potential exists for flashover to occur in these types of structures. The amount and type of combustible materials, rate of heat release of the burning materials, and an adequate supply of oxygen allow a fire to progress rapidly to the flashover stage.

F. COLLAPSE

1. In general, most townhouses are constructed of lightweight materials and methods that do not withstand degradation from fire exposure for long periods of time. Collapse of the roof members (trusses) onto the top floor can occur in an attic fire or a second floor fire. Much of the collapsed roof assembly may be supported by the top floor, nonbearing walls. Some of the roof members will create voids in the top floor rooms.
3. A fire in the kitchen may spread behind cabinets and into the soffit space. It can then spread either to the ceiling or floor above or vertically to the attic and weaken structural members in all locations in between. Fires in unfinished basements will expose structural members of the floor above. This will rapidly cause weakening of the structural members supporting the floor above. Members should be aware that an attic fire could have begun as a basement fire, spreading to the attic through interior, vertical utility voids.

4. If fire is in the floor void immediately below operating firefighters consuming structural members, the floor covering may be the only thing supporting the weight of personnel. The importance of sounding or testing the stability of the floor cannot be overstated.
5. In commercial occupancies, the installation of suspended ceilings creates a combustible void that can spread fire over the heads of attack crews, and then suddenly drop fire onto or behind them, cutting off their exit.
6. Fire spread through joist spaces of sawn wood joists will be within that space. If the floor and ceiling voids are plywood “I” beams or parallel chord trusses, the fire spread will be throughout the entire void space. In zero visibility, the ceiling should be probed with a hook or other tool.
7. Some commercial townhouses have elevators that can provide a means of vertical extension.
8. A masonry veneer wall can fall outward the distance of the height of the wall.
9. Overhead garage doors, if not supported in the open position, can close on crews operating on the interior of the garage, trapping them inside. The garage door cables and springs may fail after suffering from heat degradation causing the doors to fall unexpectedly. If opened, a pike pole [**or an A frame ladder**] should be placed at both ends of the door from its bottom to the garage floor to maintain it in the open position. If the door is unable to be opened, it should be cut from the outside, with a large triangular opening, to facilitate access into the garage.

G. FIRE OPERATIONS

1. Strategic Factors

- a. When it has been confirmed that the occupants of the structure are accounted for, self-evacuated, evacuated with assistance, or rescued, the strategic goal should then focus on firefighter safety and fire extinguishment.

- b. In most cases, fire extinguishment should be achieved through an offensive interior attack. At times, size-up will indicate otherwise; however, personnel should anticipate an offensive interior attack.
- c. The conservation of property should be a strategic goal throughout the entire incident.
- d. The rescue problem should be addressed through an aggressive interior primary search for life that focuses on the area near the fire, as well as the bedrooms and means of egress. Ventilation in this type of structure is critical in facilitating a primary search. This may be achieved through the aggressive removal or opening of selected windows where occupants might be located (venting for life).
- e. The interior exposure problem should be addressed through rapid containment of the fire. This must include advancement of an interior attack line to protect any occupants within the structure, focusing on the interior stairway if present or other vertical voids. The interior fire will be of two types: fires involving only the contents, or fires that involve the contents as well as structural members. The latter scenario provides the means for fire to extend throughout the structure.
- f. The exterior exposure problem should be addressed through an aggressive offensive interior attack, an offensive exterior attack, or by protecting exposures with a defensive attack.
- g. The confinement of the fire should be achieved through the rapid advancement of an interior attack line to protect the interior stairway and advance to the seat of the fire. If it cannot be ensured that rapid extinguishment will be achieved, then it is imperative that the hose line(s) is located in such a way as to protect the victims.
- i. The extinguishment of the fire should be achieved through the proper selection, placement, and application of the attack line(s). The compartmentation generally found in townhouses and row houses suggest that the 1¾-inch attack line should be effective in extinguishing most content fires. Fires

involving structures of this type of occupancy may require the support of several equally effective and mobile lines.

- j. The purpose of ladder deployment is to provide access to the structure and an escape route for firefighters operating within. Laddering at a fire in a townhouse should be done to the front and rear of all floors above ground level with attention given to the bedroom windows. This can generally be accomplished with ladders of less than 35 feet that are found on most apparatus on the incident scene. Remember, the 24-foot extension ladder from the engine may be suitable for some third floor levels. The need to ladder the roof at a fire in a townhouse will depend on the extent and location of the fire. Generally, the roof will not need to be laddered unless the fire has entered the attic area or has consumed multiple rooms on the top floor. Ladders should also be placed to the roof of exposures for access if there is fire in the attic. Remember to ***position ladders for rescue***; the tip should be placed just under the window sill. Ladders positioned with their tips one to two rungs over the window sill can hinder the rapid escape of a firefighter or prevent the rescue of a victim.
- J. The ventilation of this type of structure during a fire should generally be achieved through natural horizontal methods. The reason for venting should be identified and communicated to the assigned units.
- K. The need for roof openings typically will only be required when the fire has entered the attic area or has gained access to vertical void spaces. Conventional construction provides the needed support to accomplish rooftop ventilation. Lightweight construction does not provide the support necessary and may result in early collapse. Crews ordered to perform rooftop ventilation in lightweight construction should be independently supported by the use of aerial devices when practical.
- I. Ventilation is performed either to support a search by “venting for life” or support the fire attack by “venting for fire”. The decision to ventilate and the method

must be coordinated with the overall fire attack.

“Venting for life” will be accomplished through the aggressive removal of windows where appropriate. The areas of reported or suspected occupants should be addressed first. This must be immediately followed by a search of that area.

In most cases, ventilation is accomplished simultaneously with search and is sometimes required PRIOR to the commencement of the search. Ventilation coordinated with an aggressive primary search can improve the survivability of victims because it:

- Reduces heat and smoke on the interior
- Reduces potential for flashover
- Allows firefighters to search faster and more effectively
- Allows for locating the fire more rapidly

“Venting for fire” will be accomplished through the coordinated and limited removal or opening of windows in the fire area. The area where fire can be seen or is showing the highest concentration of smoke should be opened when the attack line is in position to confine the fire.

- m. Fire travel within these types of structures will be affected by the method of construction. Platform construction offers some level of fire-stopping, but all affected vertical voids must still be checked for the presence of fire with attention given to the plumbing and heating areas.
- n. Reconnaissance is a must to determine the fire’s size, extent, and location before deciding on a course of action. When it is impractical for the first officer to personally view side “Charlie,” the officer should consider ***going thru an adjoining unit to view the rear***. This will assist the first arriving officer in a rapid assessment of fire conditions. Per the Safe Structural Firefighting SOP, an IOSR should be given from the first arriving unit to the “Charlie” side of the structure.
- o. As a general rule, certain situations should cue the officer assuming command to request a second alarm such as:
 - Fire in two separate occupancies

- Fire on more than one level of the townhouse
- Fire on the second level with impingement to the roof or attic
- Known rescues.

2. Resources for Townhouse Fires

- a. The minimum resources assigned to incidents of fire in townhouses are:
 - 5 engine companies
 - 2 truck companies
 - 1 rescue squad
 - 1 EMS unit
 - 4 command officers (at least two must respond)

3. Apparatus Positioning

- a. Typical positions and initial actions are listed below:
 - First due engine – pull past the involved structure or stop short, allowing room for the truck to have the front; on-scene report, layout, size-up, IOSR report, initial attack line, search as the line is advanced
 - Second due engine – ensure water supply of 1st engine, back up line
 - Third due engine – establish secondary water supply to the rear, visual inspection of side C, hand line to the floor above, determine conditions of basement, and/or possible exposure line
 - Fourth due engine – ensure water supply of 3rd engine and R I C
 - Fifth due engine - unassigned
 - First due truck – position in front of structure; ventilation, ladder side Alpha
force entry if needed, assist with primary search and search for extension on fire floor
 - Second truck – position in the rear if possible; visual inspection of the rear, ladder the Charlie side, coordinate ventilation with 1st truck, vertical ventilation if ordered by the incident commander, force entry if needed, rescue and search for extension on the floor above

- Rescue Squad – search and rescue, utilities, assist trucks with ventilation
- b. After viewing as many sides as possible, the first-engine company should park in a position to allow for rapid advancement of hose lines into the structure, leaving priority position for the truck company. In most cases this will mean that the first engine pulls at least two addresses past the involved unit. If the truck is entering the block from the opposite direction, it is imperative that the engine stop at least two addresses short of the involved unit. The goal is to have the first arriving ladder truck in front of the fire occupancy with access to its ground ladder bed. As a rule, allow for at least 50 feet of clearance behind the truck's ground ladder bed. The first-due truck company should take a position at the most strategic location that will allow for rapid placement of ladders (front and rear) and entry into the structure. Use of the aerial should also be anticipated, and the turntable positioned either directly in front of the involved unit or upwind from the involved area.
 - c. The second-due engine will ensure that a water supply has been expanded upon. If the first engine has elected to call their own hydrant, they should consider laying a separate line while considering the chosen hydrant of the third due engine.
 - d. The third-due engine shall position to allow the crew rapid access to the structure while maintaining access and egress to the incident for additional resources. The engine should take a position to prepare for providing a secondary water supply and to allow for coverage of the rear. If rear access is not available, the third-due engine should position at the end of the row closest to the involved unit. This is to ensure that hose lines can be placed to the rear.
 - e. The fourth-due engine shall expand upon the water supply of the 3rd engine and assume the position of RIC.
 - f. Often, the forward or straight hose lay of a single supply line is sufficient. If the street is wide enough, the officer must ensure that the line is laid on one side of

the street to maintain apparatus access. Often, however, the line must be laid in the center of a narrow street, as is often found in townhouse complexes, so the truck company can straddle it while moving into position.

g. A common problem in townhouse complexes is the water supply engine blocking access to the street when spotting the hydrant. This can prevent the truck or other companies from gaining access to the scene. The officer of the water supply engine should use good judgment to prevent this from occurring. Consider the use of a short section of large diameter hose. If the hydrant is located in front of the occupancy, lay past the hydrant. If the lay is less than 100 feet, a water supply engine will not be needed [with the use of 4" hose] to support the attack engine. If this approach is elected, consider the use of a "heavy water hook-up" to maximize water at the pump's intake. **Make room for the truck.**

h. There are **three** general locations for turntable placement at townhouse fires. These are determined by degree of fire extension and location:

1. If it is a contents fire with an aggressive interior attack, place the turntable in front of the involved unit. This will facilitate the best placement of the aerial to windows, if needed. The aerial will be able to be raised to the roof of the involved unit or to either exposure (unless an end unit) easily from this position.
2. If there is an attic fire, place the turntable in front of the upwind exposure.
3. For a heavily involved situation that may require the use of elevated streams, the turntable of the first truck should be in front of the most threatened exposure. A second truck should be in front of the next most severely exposed unit unless otherwise directed by Command. If possible, both turntables should be able to rotate back to the original fire occupancy to assist with extinguishment of the main body of fire. The turntable should be far

enough away to allow the ladder to be rotated in front of side Alpha at low angles.

- i. If elevated streams become necessary, a tower ladder is the most effective unit to accomplish the task and should be requested by Command. An attempt to maintain access for later arriving trucks should always be an objective of all companies.

It is considered good practice to have trucks positioned in both front and rear on row structures. This is seldom possible in townhouse complexes. Even though the apparatus cannot get to the rear, rear coverage is necessary for ventilation, ladder placement, etc.

- j. Officers should survey the scene to determine the best fire ground position to accomplish the initial assignment of rear coverage. When access to the rear is limited, additional alarm trucks should consider stopping at the closest corner when approaching the front of the row. This will allow the truck to easily reposition to the front if needed, and facilitate operations at the rear.

- k. The rescue squad should position in close proximity to the incident while not impeding the access of later arriving units. The position of the rescue squad is not as critical as engine and aerial positioning although the functional responsibility of the crew can not be understated in importance.

- l. EMS units should position in close proximity to the incident while not impeding the access of later arriving units. They should consider the likelihood of having to transport a patient; for this reason, consideration should be made to position not to be blocked in by later arriving units.

4. Attic Fires

- a. Fires in the attic of townhouses are a result of fire originating in one of several areas which include:
 - The living area or basement that has extended into the structural components and enters the attic via void spaces
 - Interior fire that has vented through a window and exposes the vented soffit area
 - Fire that has originated on the exterior of the dwelling, has involved the siding, and exposes the soffit area
 - Fire that has originated in the attic itself by natural occurrences such as lightning strikes, electrical, or mechanical malfunction
- b. Well-involved attic fires in townhouses require a change in the assignment of hose lines. The attached exposures become a high priority in this situation. The most severely threatened exposure (***the longest side of the row should be considered over the shorter side if fire has extended to both sides of the original fire unit***) should be covered by the second hose line. The third line should then go to the opposite exposure. Additional resources will be required to support these lines and for subsequent assignments.
- c. Tactics involving fire in the attic will vary to some extent based on the location of the seat of the fire. In the case where fire has originated in the living space or basement, the fire will have to be controlled based on an aggressive interior attack on the seat of the fire, followed by hooking voids and ceilings to expose hidden fire in voids and fire in the attic. These fires may be controlled by one line in the area of fire origin, or normally will require extensive hooking and multiple lines to extinguish, depending on the amount of extension and spread.
- d. In some situations, fire impinges upon the soffit area under the eaves from which the attic vents. This can be caused from auto-exposure or from a fire that originated on the exterior of the structure. In these cases, the first task is to conduct a quick sweep of the

soffit and eave line with a hose stream. This quick sweep is intended to knock down fire extending into the attic through the soffit vents. The steam conversion drawn into the attic area can help deter fire advancement before an attack on the seat of the fire is commenced.

- e. When encountering fire in the attic only, with no involvement of the living space, unit officers should consider the following:
 - 1. At this time, the occupant's personal belongings in the living space are not involved in the fire.
 - 2. Conditions may be very tenable in the living area, even when there is extensive fire above.
 - 3. At this point there is high heat and fire in an unoccupied, relatively confined area.
A hose stream utilizing a fog pattern is indicated in this instance. Crews will want to use an attic scuttle if readily available, or poke a small hole for placement of the nozzle. Flow the fog pattern for several seconds. The fire should darken down due to the steam conversion and expansion. Avoid flowing the nozzle too long, or the ceiling may become saturated and collapse into the living area.
- f. Extensive ceiling removal may still be required to check for extension, expose pockets of fire, or for the removal of blown-in insulation. However, this tactic can "buy" crews the time to search the occupancy and deploy salvage covers without pulling the fire down into the living space. If the attic area has a floor (usually plywood), penetration from the ceiling below will be extremely difficult with conventional drywall hooks. In these instances, the officer should look for a pull-down or constructed stairway. If no stairway is found, consider opening the ceiling within approximately 2 feet of the exterior wall where the pitched roof eaves terminate. This area is often not floored due to its inaccessibility and lack of storage space. Pull-down attic stairs should not be used where fire has been present. These stairs are typically rated to only 250 pounds. Their integrity due to exposure to fire can be questionable. An attic ladder may be needed, however

in most situations the nozzle can be advanced through the opening in an 8-foot ceiling without ladders.

- g. A roof collapse hazard is present in townhouses. This is a particular concern with the presence of furnaces and hot water heaters in the unfinished attic areas. Zoned heating and cooling in large town homes or single family homes can usually be indicated by a bank of multiple air conditioning units present on the outside of the structure. In an effort to conserve space, the furnaces to these units are sometimes found in the unfinished attic. Fire within the attic space may lead to premature collapse during suppression activities.

5. Heavy Fire Volume (*Volume of fire is such that fire spread to adjoining exposures is a major concern.*)

- a. In large volume fires, a concerted effort should be made to defend the firewalls of the involved unit with elevated streams. Defending the firewalls means to apply heavy caliber streams to the fire side of the firewall to aid in preventing horizontal spread of fire to the attached exposure. If a tower ladder is on the first alarm assignment, it should be given the most advantageous position for fire attack. Consideration should also be given for other apparatus with pre-piped elevated streams. The turntable of the aerial device should be positioned in front of the involved unit. If access to the rear is available, a later arriving truck should position there. Command should consider designating which firewall each truck will defend.



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IV. REVIEW QUESTIONS

- A. List four construction styles of attached dwellings and describe features of each.
- B. Describe the construction features of fire walls and discuss where they may be located.
- C. What are the primary differences between commercial and residential town homes?
- D. What does the presence of a dormer window indicate?
- E. List two window styles and the obstacles they may present when engaging in horizontal ventilation.
- F. Usually, the basement stairs are located where in a townhouse?
- G. Describe a “zero clearance” chimney and explain the hazards associated with its construction.
- H. Describe the possible route of fire spread in each situation:
 - Fire in the kitchen
 - Fire in an unfinished basement
 - Exterior mulch fire
 - Fire on the 2nd floor venting from a window
 - Chimney fire
- I. On a townhouse fire, list some considerations in calling for a 2nd alarm.
- J. List three safety concerns for attacking an attic fire in a townhouse.

- K.** According the MCFRS Safe Structural Firefighting SOP, whose responsibility is it to check basement conditions?
- L.** Discuss positioning of the initial attack engine and considerations affecting later responding units.
- M.** Discuss positioning of the 1st and 2nd aerial on a townhouse fire; list three considerations for turntable placement.
- N.** What is FRT plywood, where can it be encountered, and what are the hazards associated with it?



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V. GROUP EXERCISE



Discuss tactical considerations for a garage fire on side “Charlie” in this townhouse.

- Where should the 1st line go?
- Where should the 2nd line go?
- What would be the possible route of fire spread?
- What is the most threatened exposure?
- List visible hazards that should be addressed.



- As 1st arriving engine company to this commercial townhouse, given the hydrant and the direction of travel as indicated, where would you position your unit?
- Would you lay out or would you call your own hydrant?
- Where should the turntable of the 1st aerial be located if fire spread to Exposure D?
- As the initial incident commander, how would you direct the first alarm companies in protecting exposures "Alpha" and "Delta?"



The townhouse indicated has an apparent fire in the 2nd floor bedroom. There is no fire department access to the rear of the row. The arrow indicates the direction of travel for the 1st arriving engine to the closest hydrant. Discuss the following:

- Placement of the 1st arriving engine company. Why?
- Placement of the 1st and 2nd aerials. Why?
- Route of fire spread to Exposures B and D
- Hazards associated with fire in the attic



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PHOTOGRAGHS

Courtesy of Lt. Michael Lowry, MCFRS